

16 July 2006

Statute of Liberty/Ellis Island Project  
Description of Circle Line Operations, Maintenance, and Repair Programs

The Circle Lines fleet is homeported at Pier C, Brooklyn Navy Shipyard. This is a 700-ft pier, approximately 75-ft wide, which is perpendicular to shore with sufficient side and end docking space to accommodate the mooring of each vessel. Inside the gate and to the right are two end-to-end office trailers. Moored adjacent to the office trailers is MISS CIRCLE LINE XIV, the decommissioned fire boat which is now a floating machine shop with substantial spares and stores. There are numerous 20-ft and 40-ft containers on the pier, each 8-ft wide and 8-ft tall, which shelter a wide assortment of materials and spares, and there are numerous items stored on the pier outside (or, unsheltered).

At the end of each workday the fleet of vessels side-ties at Pier C. Machinery is secured and each vessel is plugged into electric shore power. Shore power is provide by auxiliary generators on MISS CIRCLE LINE XIV. Those generators, on an alternating basis, run 24/7.

Running full length on each side of the pier, and across the end, are potable water, sewage discharge, and pneumatic lines.

On-site Pier C Circle Line staffing consists of the following:

2. \_\_\_\_\_ Marine Superintendent;
3. \_\_\_\_\_ Foreman;

4. One (01) Electrician;
5. Three (03) Mechanics;
6. Two (02) Iron Workers;
7. Two (02) Carpenters;
8. Five (05) Laborers (paint, bilge cleaning, etc.);
9. One (01) Laborer part time (1-2 days per month); and,
10. Watch personnel for continuous night-time presence.

The night watchman, in addition to maintaining surveillance, is responsible to top off the potable water tanks of each vessel every night.

The Pier C electrician, mechanics, etc., begin work at 5:00 AM weekdays and Saturdays. The sewage holding tanks of all vessels are emptied early each morning by the shoreside workforce. (*Vessel crews on Sundays discharge the holding tanks.*) Sewage discharge is to a subterranean tank on shore where sewage is then macerated and, in turn, discharged into the local municipal sewage system.

Every morning the electrician checks lighting in all vessels, replacing burned out light bulbs as necessary and checking any reported electrical problem. Also, two mechanics each morning are assigned to check vessel systems to verify proper operation.

The ships' crews (depending on the schedule) generally report to work at 6:00 AM or later, approximately 90 minutes before scheduled sailing time. Daily morning routine is to mop/clean passenger accommodation areas. Also, all

compartments on all boats are opened and inspected mornings and verified dry. Any bilge accumulation is pumped out and, if there is an excessive bilge water accumulation, the source of leakage is determined and resolved. Other observed conditions, such as rust formation or blistering of coatings, are reported to the Foreman.

Every Wednesday the hour meters of all engines in all vessels are taken and entered into an Excel spreadsheet.

The Foreman (based on input from boat captains/crews, directions from the Superintendent, his own observations, and Wednesday morning machinery hours readings) prepares a sheet which sets forth work assignments of Pier C staff personnel for the day.

Routine work is performed by the Pier C crew after morning departure of the fleet. Examples of daily work performed by these Circle Line personnel are: repair and construction of all gangways, interior panel repair and replacement, painting, engine maintenance, tune-ups, engine rebuilding (and removal/replacement), exhaust line fabrication, building windows, plumbing and electrical repair, etc.

The work assignment sheets prepared by the Foreman are turned back in at the end of each day. These sheets have been maintained since 1990 and serve as a record of the maintenance and repair history.

The Marine Superintendent is responsible for regulatory compliance. All vessels are required by law to be inspected by the Coast Guard and carry valid Coast Guard-issued Certificates of Inspection. The vessels are pre-inspected by shore staff before Coast Guard inspections. Circle Line strives to complete Coast Guard inspections without outstanding requirements. While solicited by the Coast Guard to apply for the Streamline Inspection Program (program whereby a responsible vessel operator can apply, be evaluated over the course of three years

and, if approved, self-inspect with minimal Coast Guard oversight), Circle Line has declined and perceives in a potential liability situation it would be better to have undergone a full rather than limited Coast Guard inspection. Coast Guard inspections are annual, with required haulout for external hull inspection being once every 24 months.

The Ellis Island-Statute of Liberty peak season is May through September, during which time often all seven boats are running. Schedules vary but the boats generally depart Pier C between 7:00 AM - 8:30 AM, or sometimes an hour or so later. The end of day return to Pier C is generally  $\pm$ 7:00 PM.

The Circle Line operations, maintenance and repair history, and programs are additionally described as follows:

1. A tanker fuel truck delivers diesel weekly, at Pier C, to all vessels and MISS CIRCLE LINE XIV, thus eliminating the need for the boats, with crew, to make after-hours trips to a fuel dock. We estimate diesel fuel costs at approximately \$20,000.00 per week.
2. The Ellis class boats (MISS ELLIS ISLAND, MISS NEW YORK and MISS NEW JERSEY) have emergency auxiliary generators. These are the newest of the fleet, built between 1991 and 1993, and, unlike the older vessels, are subject to new regulations requiring auxiliary power on vessels carrying more than 600 passengers. The emergency generators are tested daily by the auto-start mode, simulated by lost electrical power each morning when shore power is disconnected. The emergency generator diesel engines run a few minutes daily and are then shut down.
3. Main engine oil and filters are changed at 400 hours. Auxiliary diesel generator bow thruster engine oil and filters are changed ever 250 hours. Emergency diesel generator engine oil and filters are changed

annually. Engine oil and filter change work assignments are issued by the Foreman, based on weekly hours reports of the calendar for the emergency diesel generators. Oil samples are sent in for analysis, with reports maintained in individual files for each engine. Air filters are changed every 500-600 to 1,000 hours, as needed. Reportedly the Circle Line filter expense is approximately \$30,000.00 per year.

4. Main engines are tuned every 1500-2000 hours (injectors, valves, etc.)
5. Six of seven of the Circle Line vessels have Cummins KTA 19M main engines, thus greatly homogenizing the inventory of spares to support the fleet. MISS FREEDOM is powered by Detroit 12N71's, which while out of manufacturer are still supported by Detroit. Formerly each of the fleet was Detroit-powered. Re-powering reduced vessel average daily fuel consumption, based on 10 hours' underway time, from 385 gallons to 180 gallons.
6. Circle Line has changed fuel pumps, injectors and turbos to meet current EPA emissions standards. Circle Line voluntarily uses low-sulphur diesel, at an additional cost (depending on market conditions) of six to ten cents per gallon. Low sulfur fuel has been found to be a favorable maintenance enhancement, such as savings on injector wear.
7. The main engines on each vessel operate an average of 3,000 hours per year and, on the average, are replaced with a rebuilt engine every five years/15,000 operating hours. Cummins recommends the KTA 19M be rebuilt at 20,000 hours. Reportedly at 16,000 hours noticeable wear begins to appear, and at 17,000 hours and beyond the chance of a failure increases. The Circle Line experience has been that at 15,000 hours there is zero sludge and bearings show little wear

at rebuild. If, at the end of a season, a main engine has 14,000 hours it will be replaced rather than run up to 17,000 hours over the next season. Heads are serviced at 7,000 hour intervals. Circle Line has never had a Cummins engine failure necessitating pulling a boat out of service.

8. Generator and bow thruster engines are rebuilt at 14,000 hour intervals.
9. Circle Line has an ample inventory of spare electric motors. Replacement AC motors are readily available, and there is a large supply of vintage 1960's and before DC motors. One-of-kind old DC motors for which there are no spares are sent out to specialty shops for needed work, such as rewinding and balancing. Annually electric motors are tested by amp probes.
10. Circle Line hauls out the passenger boats at 18 month, not 24 month, intervals for routine hull maintenance and Coast Guard inspections. The Circle Line experience with 24-month haulout intervals is that coating deterioration over the final six months accelerates. Reduction of haulout intervals to 18 months has proven cost-effective regarding the amount and degree of needed maintenance. Each routine drydock involves servicing sea valves and thru-hulls, pressure washing the hull, and recoating. The underwater hull coating is two part epoxy Ameron 214 non-tin anti-fouling coating. On average once every 9-10 years the hulls are lightly sand-swept and recoated. If at drydock local coating deterioration is noted, the local area is sanded and touch-coated. Zincs (owner-supplied) are renewed at 40% wastage. Tailshaft bearing readings are taken at each drydocking and are maintained on file. Generally at .0065 - .0070 bearings will be changed. All vessels were carefully aligned at new construction. Bearings are not changed unless needed, and tailshafts

are not pulled unless needed. Bearings in the Ellis class generally last 12-15 years. The last MISS ELLIS ISLAND shaft readings were all .0020 or less. Propellers are serviced as needed. Spare propellers and shafts are maintained for the entire fleet. MISS CIRCLE LINE has magnesium bronze propellers; the Ellis Island class has stainless steel ASTM A-743 three-bladed propellers. On the average, the cost of a routine drydocking with no unexpected work is approximately \$20,000.00.

11. The only reported instance during a drydocking of needed hull plating renewal due to deterioration was to one of the older boats in the 1980's due to an electrolysis problem. The affected area was a small band, and there has been no recurrence.
12. Hull coating above the waterline is an epoxy base coat with top coat of International Interthane (\$140.00 per gallon). Interior compartment coating is Devoe 2-part epoxy system. Deck coating is a combination of Neotex (rubberized vinyl over cleaned/prepared deck) and PRC non-skid. The superstructure exterior paint is quick-dry enamel blue. The Circle Line Pier C maintenance crew recoats all interior and exterior surfaces of each vessel above the waterline annually. On an as-needed basis rust areas are scaled and touched up with two coats.
13. During interior inspections, if fractures are detected they are scaled, re-welded, stress relieved by needle gun, then coated.
14. Gangways have wood deck which is primer coated, with 3M non-skid strips applied to the walking surface. Boat stairwell treads are diamond plated with 3M non-skid strips applied. 3M non-skid strips on average last 18 months and are replaced sooner, depending on wear.